

Antenna Testing Laboratory Automated System

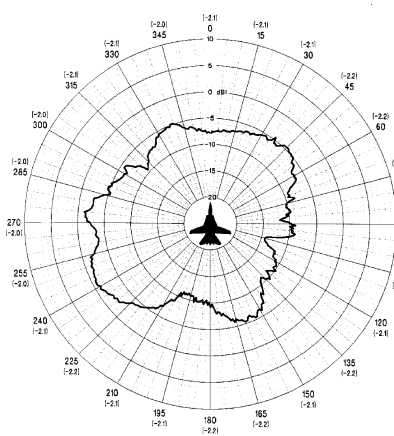


The Naval Aviation Systems Team Antenna Testing Laboratory Automated System (ATLAS) provides in-flight antenna measurements and analysis of airborne antenna systems. For over forty years engineers at Patuxent River have been a pioneer in developing the science of in-flight antenna measurements. ATLAS is designed to evaluate various airborne antenna systems operating in the 2 MHz to 18 GHz range. Antenna patterns at several frequencies can be measured simultaneously, thus saving flight time. The ATLAS location on the shore of the Chesapeake Bay, provides a dedicated antenna measurement site for antennas, CNI, and propagation analysis. The topography of the ATLAS site provides the unique features required for in-flight antenna measurements; i.e., the relatively calm waters of the Chesapeake Bay and surrounding low level land masses present an unobstructed field-of-view in an area free of electromagnetic interference sources that could contaminate measurements. These features allow for the accurate prediction of the multipath range effects to obtain the free space antenna patterns. The Atlantic Test Range provides radar space position, tracking, and aircraft vectoring services via a

ATLAS Provides the Tools for Antenna T&E

Synchronous Data Link Control protocol interface with a data rate of 50 Kbits. Space position data or other data can be exchanged bidirectionality between the two facilities.

Flight test profiles are varied to ensure that all maneuvers are well within the safe operating limits of each airframe and the characteristics of the antenna itself. There are basic profiles which may be predictably altered that have been established for routine testing.

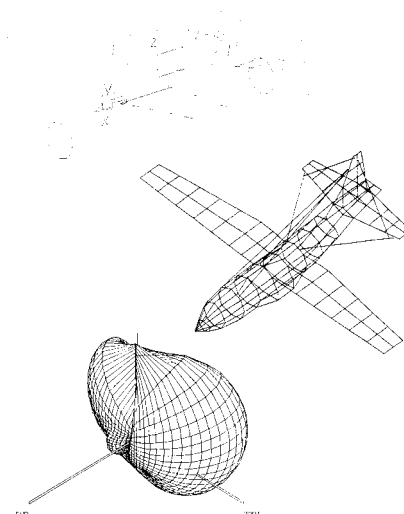


The ATLAS testing procedures requires only that the aircraft transmit a CW or limited pulse type signal through the antenna under test; and hence, no onboard instrumentation installation or modification is usually required. When the aircraft system associated with the antenna to be tested cannot transmit or receive the proper test signal, small CW transmitters can be quickly installed. When further enhancement of the measurement accuracy is required, a telemetry package that will transmit aircraft pitch, roll, heading, and other data to the ATLAS can be installed.

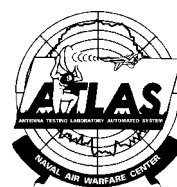
This microprocessor based telemetry system is primarily used to read the aircraft attitude data, but it is also able to format virtually any kind of digital or analog signals for transmission to ATLAS. In addition, it can acquire data from an airborne acquisition system and send it back to ATLAS in real time.

The antenna evaluation system at ATLAS facility is highly adaptable and flexible. It consists of airborne transmitting units, receiving antennas, high speed data acquisition, reduction and analysis systems. It provides the necessary capabilities to collect, store, reduce, analyze, print and plot the measured antenna pattern data in various formats. The acquisition system consist of a VME real time UNIX based system allowing sampling rates as high of 1000 samples per sec per frequency. The ground RF receiving system consists of computer controlled receivers and spectrum analyzers covering the frequency range of 10 KHz to 40 GHz with varying IF bandwidths between 10 KHz to 20 MHz. The reduction and analysis system consist of PC's and UNIX based workstations with customized and commercial software.

ATLAS provides analytical tools for antenna engineers to conduct numerical computer modelling of antennas installed on complex structure such as aircraft, ships, land vehicles and others. Engineers use method of



moment and geometric theory of diffraction based computer codes to determine antenna characteristics installed on different structures. This data is used to augment data collected from other antenna measurement techniques thus providing the engineer with in-depth knowledge of the antenna performance on a particular platform.



For more information about ATLAS, contact the Naval Aviation Systems Team at Patuxent River, MD at 301-342-3166.